MCG Today

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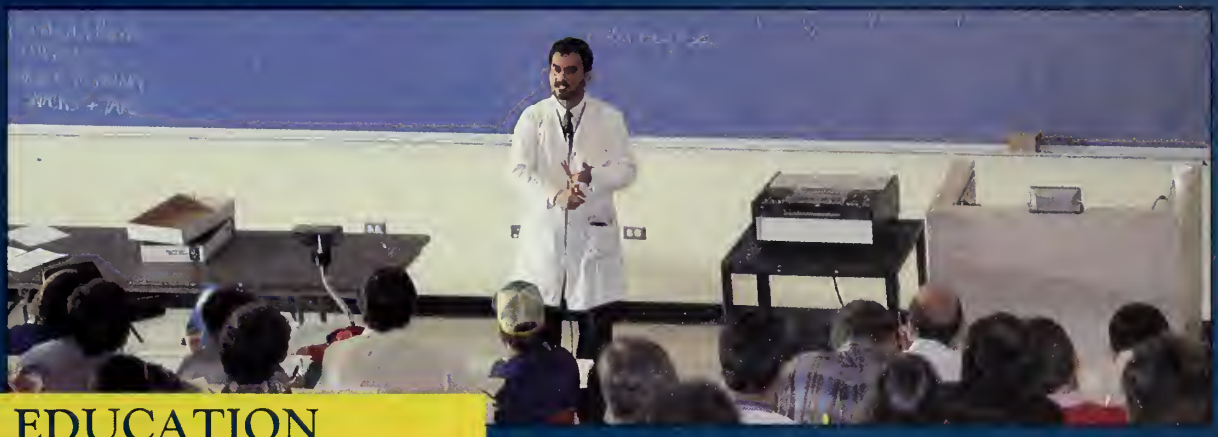
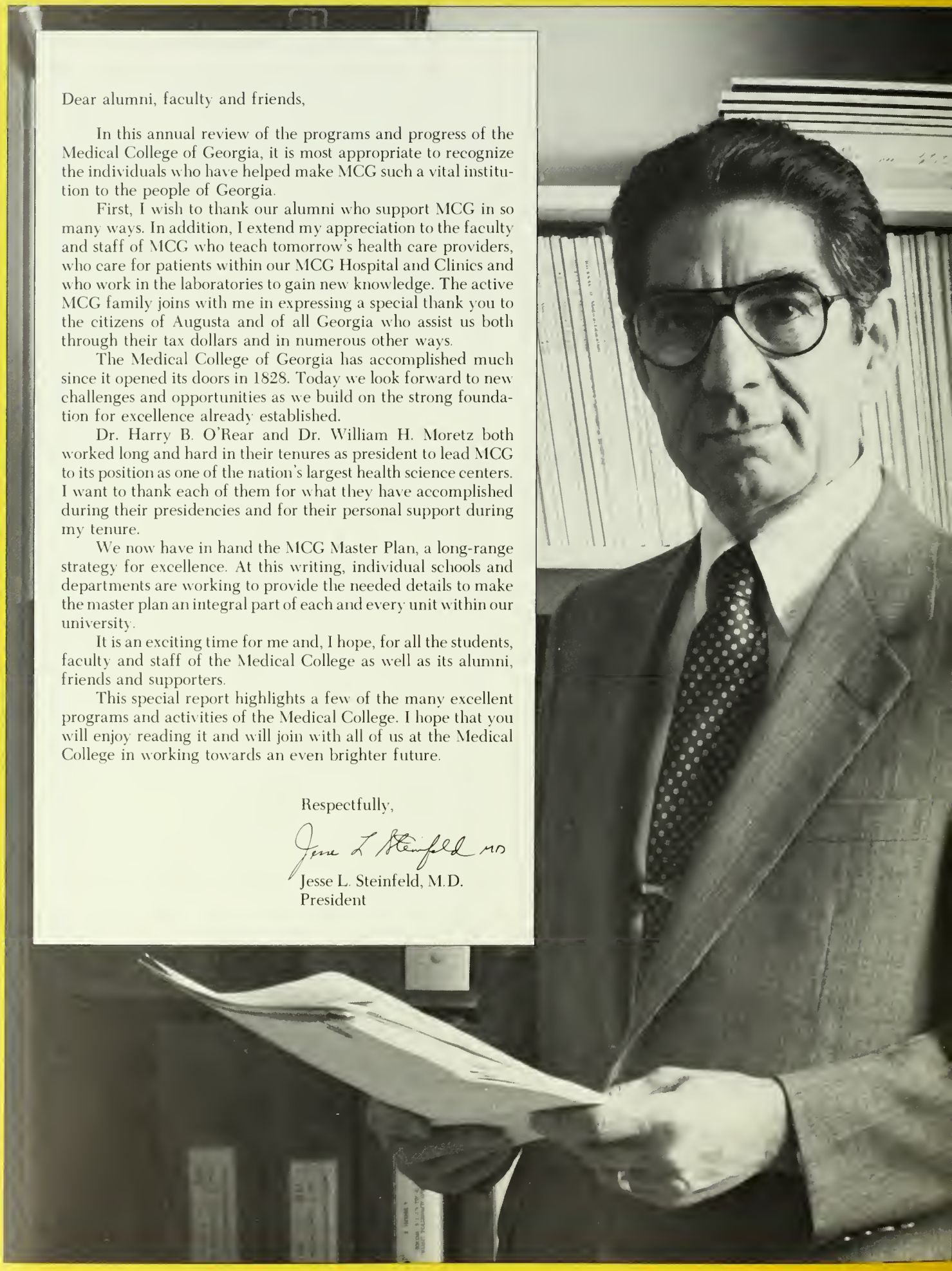


EDUCATION

RESEARCH

PATIENT CARE

1985 ANNUAL REPORT ISSUE



Dear alumni, faculty and friends,

In this annual review of the programs and progress of the Medical College of Georgia, it is most appropriate to recognize the individuals who have helped make MCG such a vital institution to the people of Georgia.

First, I wish to thank our alumni who support MCG in so many ways. In addition, I extend my appreciation to the faculty and staff of MCG who teach tomorrow's health care providers, who care for patients within our MCG Hospital and Clinics and who work in the laboratories to gain new knowledge. The active MCG family joins with me in expressing a special thank you to the citizens of Augusta and of all Georgia who assist us both through their tax dollars and in numerous other ways.

The Medical College of Georgia has accomplished much since it opened its doors in 1828. Today we look forward to new challenges and opportunities as we build on the strong foundation for excellence already established.

Dr. Harry B. O'Rear and Dr. William H. Moretz both worked long and hard in their tenures as president to lead MCG to its position as one of the nation's largest health science centers. I want to thank each of them for what they have accomplished during their presidencies and for their personal support during my tenure.

We now have in hand the MCG Master Plan, a long-range strategy for excellence. At this writing, individual schools and departments are working to provide the needed details to make the master plan an integral part of each and every unit within our university.

It is an exciting time for me and, I hope, for all the students, faculty and staff of the Medical College as well as its alumni, friends and supporters.

This special report highlights a few of the many excellent programs and activities of the Medical College. I hope that you will enjoy reading it and will join with all of us at the Medical College in working towards an even brighter future.

Respectfully,

Jesse L. Steinfeld MD

Jesse L. Steinfeld, M.D.
President

MCG Today

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Executive Editor
John T. Anderson

Editorial Staff
Brenda Drake
Karen Williams

Design
Cher Cornett

Photography
Elizabeth Harrington
William A. Willner

Articles for this special issue were written by **Toni Baker**, assistant director for institutional relations.

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Teaching tomorrow's physicians, doctor's greatest role

When Dr. Abdulla M. Abdulla stands in front of a crowded lecture hall he tells himself that teaching medical students is the most important thing he has ever done.

And he believes it.

"If you want to be somewhere else and you are doing this because you are forced to, (students) are going to pick up on it," says Dr. Abdulla, professor of medicine and director of the cardiac catheterization laboratory at the Medical College of Georgia.

Dr. Abdulla understands the frustration that causes, because before he ever stood in front of lecture halls he spent years sitting in them.

"I was really distressed . . . that many of the teachers that I was exposed to would come into the classroom acting almost like it was a chore they had to do."

There was another problem. His teachers often did not tie the scientific information in the lectures to the realities students would face one day as doctors.

"My philosophy is that when I get into the classroom, I believe that is the greatest thing I've ever done in my life. It's very much like a stage and you are an actor. If you don't get into the role, students are very astute, they pick up on body language.

"So when I go in there I psych myself up, you know, this is the greatest thing I've ever done in my life. There is nothing I'd rather be doing at this moment and for the next hour.

"I realize how important it is to the students. If it is important to the student it has to be important to me."

So Dr. Abdulla hams it up in a sophisticated sort of way. He never lets his voice become a drone. "You walk in dynamic. Good morning!" he explains. "You walk in there and you are ready to go."

He usually picks out four or five students to use as gauges to measure his effectiveness that day. One or two of the students are invariably perched on the edge of their seats, a couple of others appear cautious and one or two more are bored by the entire affair, maybe busy writing up a physical on a patient seen the night before.

Dr. Abdulla wants the ones on the edge of the seat to stay there as he teaches, but the less intense students are his target.

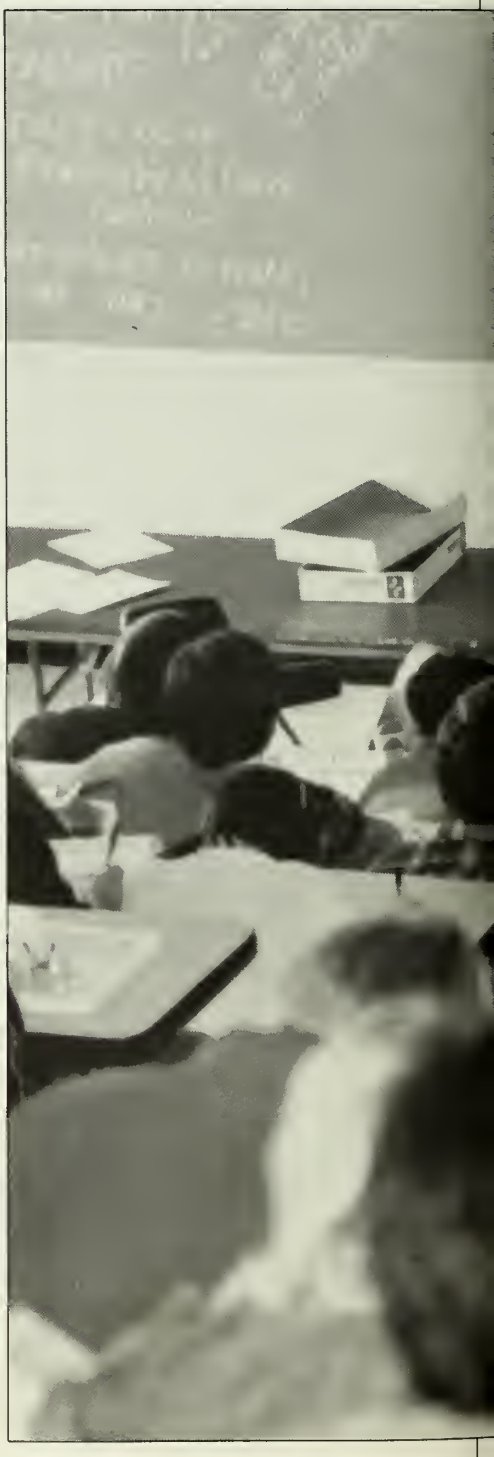
"You just have to be very careful about lighting a fire and then keeping it lit for the 45 minutes that you talk," he said.

To fan the flames, rather than traditional visual aids, he uses his hands and body, drawing circles on his chest and fashioning his hand as a pumping heart.

He mimics heart sounds so the students literally hear the signs of a troubled heart. "I used to think cardiologists had a God-given knack for listening to the heart and comprehending heart sounds and coming up with a diagnosis." Then he found out it was "all an act," that really it was a simple thing in medicine. Dr. Abdulla shares that old concern and his current insight about the real mystery of heart sounds with his students.

He always goes into the lectures a little scared. It keeps him on his toes. He's intimately familiar with the material but there are no notes or cue cards, maybe not even slides. "I don't have anything to fall back on if I'm at a loss for words.

"To show slides you have to turn down the lights," he said and smiles. "If slides show something you can't explain, great." Otherwise he won't use them.



Dr. Abdulla Abdulla talks with medical students about the heart and what can go wrong with it.

EDUCATION

"My philosophy is that when I get into the classroom, I believe that is the greatest thing I've ever done in my life."

Dr. Abdulla remembers as a student a particular physiologist who came to class bearing many slides.

"One had 75 lines, the print was small and unreadable." Still the teacher insisted, 'And this slide clearly shows . . .' "Now he'd looked at that slide a million times and maybe it showed something to him, but that wasn't what scared me," Dr. Abdulla said. "What scared me was he turned around and looked at me and said, 'Do you understand me?"Dr. Abdulla didn't, but with the rest of the class bobbing its head up and down he didn't want to appear a fool. "So you nod."

Although the slide didn't teach him much about medicine it did provide a valuable lesson in teaching medicine.

"I don't say this slide clearly shows." He also avoids saying, "As you know," the implication being that if you don't, you are a moron.

As his lecture progresses he stops to ask for questions and ask if he's getting through. "If they don't understand, it's not because they are stupid," he said. It just means the students haven't been exposed to the material in an understandable way. He figures he's the one that's failed, not the students, if students leave his class confused.

In his 10 years as a teacher, the cardiologist often has his peers sitting in front of him rather than students. "I have more fun with the students. I don't know which one is easier," he said.

With his fellow cardiologists it tends to be straight information he serves up.

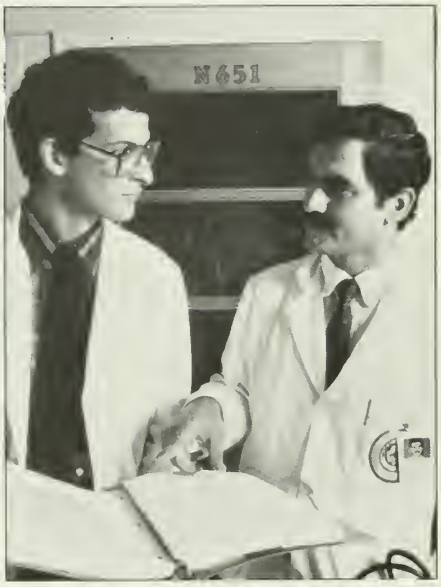
But for students, he tells them up front he's going to insult their intelligence, then comes up with analogies that help him drive a point home.

Dr. Abdulla likes to compare the heart to an automobile engine, oxygen supply and demand to clogged fuel lines and revving up that engine.

He relates his teaching approach to that of a successful comedian. The funniest people are those who take ordinary life and tell stories about it.

With the students, it's a matter of taking scientific information and relating it to the world they live in.

"If you knew a body of information could be gotten across and retained just by mouthing it, there would be no problem. But we all know that is not true. You can stand up there and mouth a lot of scientific knowledge and students will retain about 40 percent of what you cover when they walk out of the classroom. In a month, they remember maybe 10 percent. You really need to highlight and drum it into the student. To do that you've got to do something different. You've got to ham it up a bit.



Dr. Abdulla talks one-on-one with senior medical student Steven Ryals.

"There are a lot of good teachers on campus. I'm not the best," Dr. Abdulla says.

But the best teachers are "non-monotonous," he says, then apologizes for making up a word.

To attempt to make sure he stays "non-monotonous" he does an autopsy on every lecture he gives. "What was wrong with it? Why didn't I do a good job?

"I would very much like for a couple of faculty members to sit in the audience and critique me for content, critique me for delivery."

To improve further on the teaching end, Dr. Abdulla would like to see the testing end changed in medical school.

"I think we should dispense, and this is the problem with medical education today, with heavy reliance on multiple choice questions," he said.

Every test a student takes through school and until he takes his boards to become certified in a speciality is multiple choice and all cue responses.

This approach has students studying to respond to questions, reading a page and knowing that all they have to do is recognize the right information — not actually recall it.

If a student had to fill in blanks without those cues, his approach to learning would be different, Dr. Abdulla says. The easy justification of the heavy reliance on multiple choice is that the tests are easy to grade; anyone could mark them.

Grading of tests where students fill in blanks or respond orally takes more time and can even become subjective.

But the MCG doctor and teacher has developed a computer system that is used as a teaching tool today, but could be used as just such an objective test-giver.

His system makes use of natural language, a laser-video disc and fast response time, allowing a student to put himself in a realistic scenario with a patient and test his skill and knowledge in handling that patient.

"It's like an airplane pilot on a simulated flight and while he's up there knock out his engine and blow out his tires and see how he responds."

His system, developed with the help of John Henke, computer site manager for the Veterans Administration Medical Center in Augusta, has been used by a number of other medical schools.

The computer can teach you about hypertension in pregnancy, cardiopulmonary resuscitation of the infant and child, medical management of a complicated heart attack, ultrasound, lung disease and on and on.

The system can field up to 600 responses per question and each response can have multiple variations. The user-friendly system can even tell a student how cost-effective his treatment was. And it does all this objectively, without concerns over whether the student was smacking gum or sporting a tie.

Also, because it's one on one, the student can progress with the computer at his own pace; and a teacher can't do that with 180 medical students. ■

Tomorrow's health professionals, what MCG is about today

Students are what the Medical College of Georgia is about.

MCG has 1,875 of these students in five schools, according to the latest figures from the Office of the Registrar.

Schools are the School of Allied Health Sciences, the School of Dentistry, the School of Nursing, the School of Graduate Studies and the School of Medicine.

Of the 1,875 students in those schools, 1,710 are Georgia residents, 148 come from other states and 17 from foreign countries.

Add to that total student population another 429 residents who are working toward certification in medical and dental specialties.

MCG has 32 residents in the School of Dentistry, seven of whom are graduates of the school. There are 397 residents in the School of Medicine and half of those are MCG graduates. Remaining dental and medical residents come from schools across the United States and other countries.

To make the teaching and training of such a large number of students and residents possible, MCG has literally hundreds of agreements with medical facilities off campus.

Some 90 percent of those facilities are in Georgia. MCG might have numerous agreements with a single institution, such as the extensive affiliation with the Veterans Administration Medical Center here in Augusta.

MCG also has broad teaching agreements with facilities in Savannah, Atlanta, Macon and Columbus.

"The idea is (students and residents) have to get skill and exposure in a certain discipline," said Dr. Thomas J. Zwemer, MCG vice-president for academic affairs.

Even with Augusta's large medical community, MCG must reach beyond the city limits to give students this exposure.

Dr. Zwemer sees the act of sending students and residents to other institutions as a win-win situation.

"The quality of care is enhanced by having the standards of an academic teaching center applied to that hospital," he said of the facilities that take students.

Also, students get early exposure to career opportunities and the institutions get good exposure to potential future employees.

"The main thing that happens as I see students come back is the level of maturity they have reached," Dr. Zwemer said.

After graduation, former students go to literally every state in the nation, although the vast majority — 6,835 alumni as of June 1985 — are living in Georgia. Alumni also live in about 20 foreign countries. ■

Legal residence of Georgia students by county for all schools, Fall 1984

Located, living, Georgia alumni of MCG by county including graduates of all schools through June 1985

Medicine in smaller towns offers challenges, variety

Dr. Monty Shuman does a routine examination on Mary Skipper.

Dr. Andy Williamson proved you can go home again when he hung up his shingle in his native Dublin.

He placed it alongside that of Dr. Monty B. Shuman, who didn't exactly go home but, at 70 miles away from his native Statesboro, he got close.

"I tell everybody I plan to live and die in Dublin . . . as long as they will keep me," says Dr. Williamson, an affable young family medicine doctor who earned his medical degree at the Medical College of Georgia and recently completed his specialty training here.

MCG-schooled and trained Dr. Shuman, now a veteran of six years in the south Georgia city, also has cozied up to the life of a smaller town practice.

He reasons the initial attraction was his rearing in a similar place.

"I came here and found a medical community that was excellent . . . no fighting, no battles," Dr. Shuman said.

He says he couldn't have found better partners than those who have pooled their talents in Dublin.

The two share a practice with three other family medicine doctors. Two of the other partners, Dr. Steven Garner and Dr. James A. Kibler, also are MCG alumni.

"Most people feel like when they leave a big city they give up something," Dr. Williamson said. He did experience some sense of loss when he left Augusta and he even considered practicing medicine in Augusta.

But the call back home was stronger.

"I miss Augusta. We lived there for seven years," said Dr. Shuman. He and his family still visit. "I wish it was 50 miles down the road." It's more like 100.

But the two maintain that big-city hospitals don't have to be the stuff of which good medicine is made.

"The vast majority of people don't need all that," Dr. Shuman said. When more technology or a unique specialist is needed it's just a ground ambulance or helicopter ride away.

"Your attitude changes as you go along," said Dr. Williamson. "Places like MCG are needed, but not by every patient. I don't see the number of sick patients I saw in Augusta but I've definitely seen some very sick people."

Drs. Shuman and Williamson had toyed with the idea of pursuing family medicine or pediatrics in their tenures at MCG.

But it was the lure of being able to see a variety of illnesses and still provide continuity of care that won them for

family medicine.

"We see everything," said Dr. Shuman. A day can bring with it patients with everything from a bad cut to heart trouble to diabetes.

"It's a fast pace. There's a great demand for primary care," he said, estimating he might see 45 patients in an average day.

With a few exceptions — Dublin doesn't have a cardiologist, cardiothoracic surgeon or neurosurgeon — the physician-base in Dublin offers just about everything that is needed.

"I think you know your pattern of referral. When you are not sure, you get a consultation," Dr. Shuman said.

Dr. Williamson, five months out of his residency, still is fine-tuning his handling of patients who come to the five-man downtown Dublin practice.

"I'm working on getting in and out fast and still spending a little bit more time with them," he said.

If anything, he's found life in private practice more stressful than he anticipated. Dr. Williamson says it's probably just the sheer volume of patients that need tending in a day's time.

"I feel tired when I go home," he said, but concedes that he might get there earlier than he did when he was an MCG resident.

Days in the deceptively small-looking office — it actually has 16 examination rooms — get started about 8:30 a.m. and wind down about 6 p.m. "We're generally not real late," Dr. Shuman said. The office also opens a half day on Saturday and every fourth night is an on-call night for the physicians in this group practice. After-hours calls are not unusual.

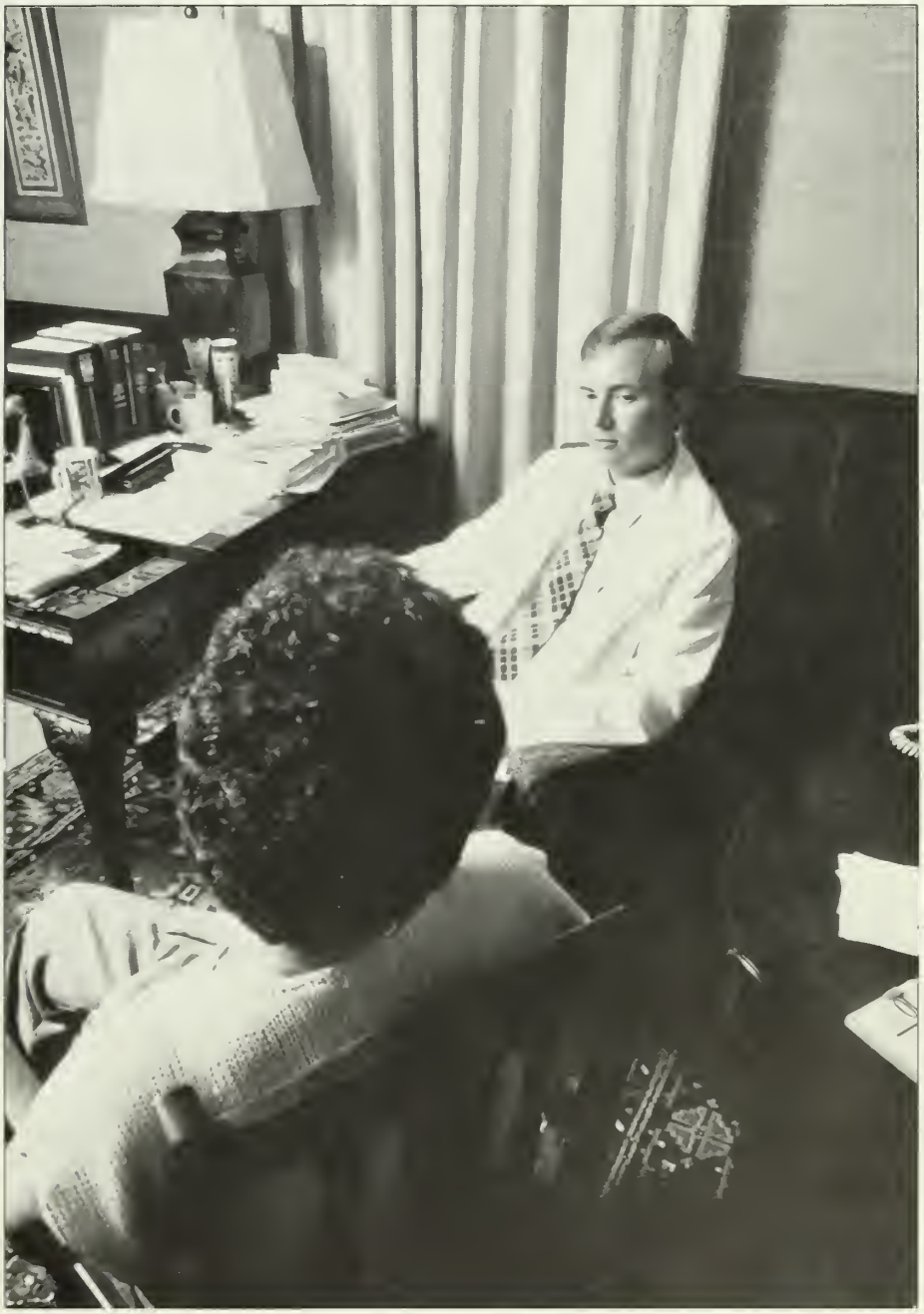
Still the young physicians seem to have found what they were looking for among an amicable group of peers with a busy practice, but one that still leaves time for families and enjoying life outside the office.

And despite both doctors' original interest in pediatrics, their actual practice is yielding more patients on the other end of the spectrum.

"It's just a growing population," says Dr. Williamson of the heavy geriatric population he's treating. He says exposure to the older segment has been fun and rewarding.

"Some of them can tell me a lot better jokes than I can tell them," Dr. Williamson said.

"I think they appreciate you," commented Dr. Shuman. "They have time for you if you have time for them."



Dr. Andy Williamson takes time to talk to a new patient.

Porcelain and metal union

Dental researchers at the Medical College of Georgia are seeking ways to improve the merger of porcelain and metal to form attractive, durable caps and fixed bridges.

"There's a lot more right with it than there is wrong," Dr. Carl W. Fairhurst, Regents professor and coordinator of dental materials at the MCG School of Dentistry, said of the merger which can yield a cap or bridge that looks good in the mouth and stands up well under biting pressure.

This porcelain to metal bonding came into use in the 1960s. But at the time the metal portion of the combination was almost exclusively high-gold content alloys.

When the price of gold escalated, dental researchers began looking for other metals that could serve well, but more cheaply.

But there's a potential problem with the metal combinations that have been used since.

For example, during production of a cap, a thin metal cap is cast for the remainder of the tooth much as a jeweler fashions a ring, Dr. Fairhurst explained.

Then onto the metal cap a glassy porcelain is fired so that the tooth has the proper anatomic shape. Porcelain is essentially clear and pigments can be added to it to match natural teeth.

Both materials are then cooled to room temperature.

That's when the problem might occur.

If the porcelain and metal don't cool at the same rate, stress points can set up in the porcelain, Dr. Fairhurst said. The development of severe stress points is the exception rather than the rule. But when they occur, the cap is at risk for a fracture.

"What we'd like to do is build in a better safety measure than we have right now," Dr. Fairhurst said.

The higher gold alloys were more compatible with porcelain in its cooling and MCG researchers now are trying to understand what truly constitutes the incompatibility of the current metals used with porcelain.

Dr. Fairhurst demonstrates use of viscometer, which measures high temperature flow of ceramic material.

Researchers here are taking measurements of the glass transition temperature, the temperature at which the material turns from a viscous liquid to solid porcelain during cooling.

They also are measuring the rates at which metals and porcelain shrink during cooling. It seems that the metal cools more uniformly than the porcelain.

But by the time both reach room temperature, the amount of shrinkage both have done needs to be the same.

Dental researchers here have developed a preliminary mathematical model that will tell a fabricator of these dental restorative materials what the limits of expansion compatibility would be. The researchers are constantly working to refine that model.

They also want an overall model for the ideal porcelain-metal system.

During efforts to measure properties of shrinkage and the temperature at which porcelain solidifies, researchers found existing equipment to take such measurements was inadequate.

So MCG obtained National Institutes of Health funding to develop proper research tools. The equipment has been developed and is being used on campus.

Studies of these porcelain-metal combinations largely have been funded by the NIH as well as other sources. ■

Dental implants

Dental implants, those devices placed in or on the jawbone to secure a single false tooth, a fixed bridge or even an entire set of teeth, are being put through the paces at the Medical College of Georgia School of Dentistry.

A special MCG implant task force has been created and is using guidelines developed during earlier research at the school to study and provide objective, long-term review of implants in both man and animals.

Work of the task force — an interdisciplinary group that includes Dr. Ralph V. McKinney Jr., Dr. Gregory R. Parr, Dr. Allen Sisk, Dr. James Keagle and others — should contribute to the pool of information available on oral implants by providing good, scientific information based on years of following patients and specific guidelines.

It is not that patients coming to the dental school are told that implants are experimental. After all, modern implantology in the United States dates back to World War II.

"What is recent is that success rates have been improving to the point where we are starting to get predictability, which is what dentistry needs before it will accept this type of treatment on a routine basis," Dr. Parr said.

Implants are made of a variety of materials and are surgically inserted into a patient's mouth in a number of ways. Designs vary from a screw-like device that is placed in the jawbone to secure a single false tooth to a more complex type that sits on the bone and under the gum to support a lower denture.

A number of dental patients don't need implants. They can be satisfied with good-fitting, conventional removable dentures.

But what about the 68-year-old man who has been wearing dentures for 30 years and has lost most of his lower jawbone? He can no longer eat or even speak with his dentures. Before implants came along there was no help for such a person.

Other patients just cannot tolerate a removable denture and gag when they try to do so. "Some will complain that they just don't like having to take their denture out," said Dr. Barry M. Goldman, prosthodontist who has traveled as far as Toronto to study an implant technique that was developed in Sweden and has been followed for nearly 20 years with high success rates.

In addition to the clinical studies, MCG has been participating in some nuts and bolts research of oral implants.

"We call ourselves the I-team," said Dr. McKinney who chairs MCG's department of oral pathology and is a member of the three-man implant research team.

David E. Steflick, MCG cell biologist and electron microscopist, and Dr. David Koth, who now chairs the department of fixed prosthodontics at the University of North Carolina, round out the team.

Six years ago the "I-team" began studying a ceramic implant developed in Japan. At the time there was no valid biological data that justified using in man this material that resembles something in use in the computer chip industry.

Japan had some data supporting use of the material, but it was difficult to interpret, Dr. McKinney said.

The system was tested for two years in animals and now is being used in man. The researchers have found that the ceramic material is even harder than some metals and it won't corrode as metals can. Research also has shown that these implants form a biological seal or attachment, in other words, they actually become a part of the mouth.

The dental implant is in a unique environment, Dr. McKinney explained. Part of it is seeded in the bone and soft tissue as well as the oral cavity. A biological seal helps keep plaque and bacteria that collect on the teeth from getting into the gums as readily and causing disease.

The natural tooth has a similar seal, called a biological attachment zone. Obviously even the natural seal is not perfect since people do get gum disease. Actually, gum disease is the leading cause of tooth loss in adults.

Dr. McKinney said the research results do not mean that one implant is superior to the other. "Our feeling is that there is a place for all these systems," Dr. McKinney said, referring to the options available in implant materials.

"We don't advocate the ceramic over the metal system, that's not our place," he said.

Rather the goal is to know the strengths and weaknesses of each system in order to pick the best one for a specific patient. ■

An electron micrograph of a dental implant in bone. The insert shows examples of dental implants.

Research activities boosted through increased funding

Extramural support for research efforts at the Medical College of Georgia increased 54 percent from fiscal year 1984 to 1985.

Awards from pharmaceutical companies were up 200 percent and support from federal sources, such as the National Institutes of Health, was up 27 percent.

MCG also experienced a 53 percent increase in support from foundations.

The increases meant $7,723,035 in research funds for MCG in 1985. All told, including public service funding, extramural support reached $9,904,297.

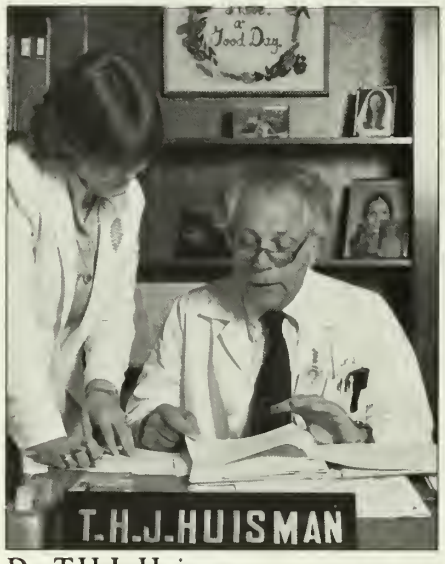
Research is carried out in more than 30 different areas of interest.

Here are short summaries of some of the work made possible by new or continued support. The principal investigator is named on each project.

• MCG researchers have made a significant step toward the day when there will be banks of frozen donated organs from which doctors can pick the most perfect match for a transplant. Researchers have removed dog kidneys, treated them with a substance that prepares the organ for freezing and had the kidneys survive and function again after being returned to the animals. The MCG lab team now is working with engineers at the Georgia Institute of Technology to develop heating equipment that can be used in the research. A. Karow, Department of Pharmacology, School of Medicine.

• Double-blind studies are underway for drug companies on a number of new products designed to control acne. J. G. Smith, Department of Dermatology, School of Medicine.

• An in-depth study of the alterations and variants in hemoglobins and their roles in thalassemias and sickle cell disease continues. T.H.J. Huisman, Department of Cell and Molecular Biology, School of Medicine.

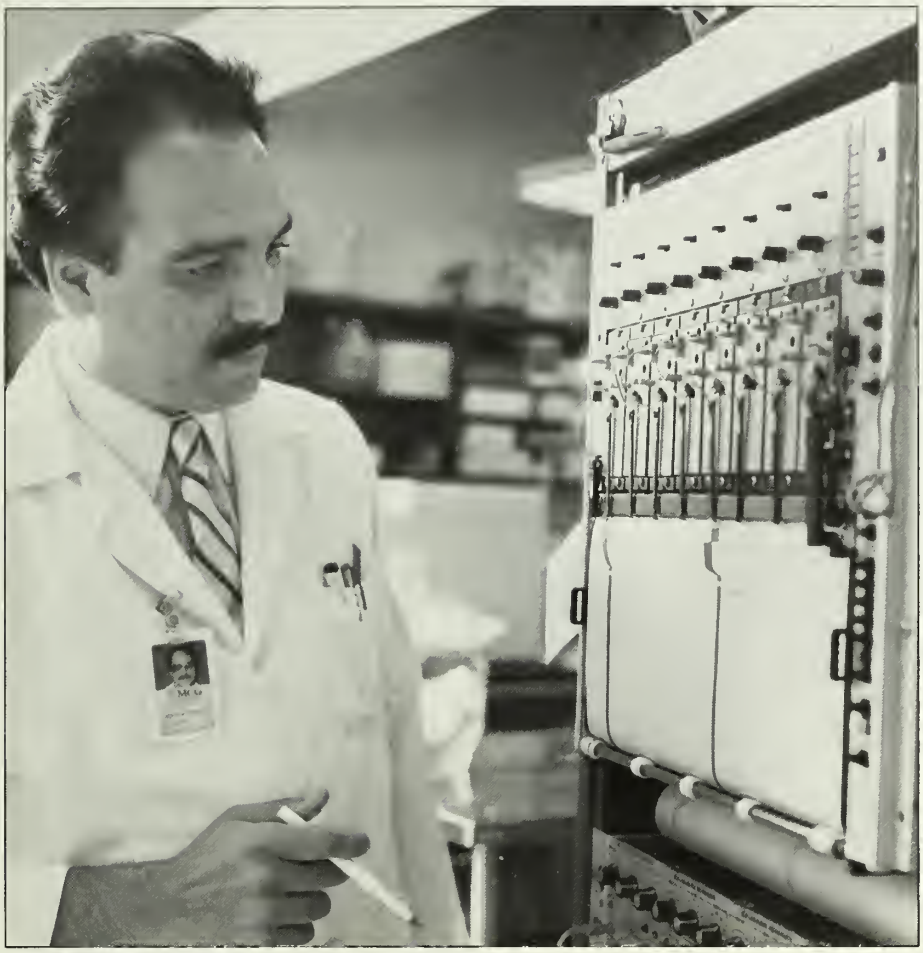


Dr. T.H.J. Huisman

• Studies are continuing on models of arthritis to learn about the chemicals released which cause pain. L. Greenbaum, Department of Pharmacology/Toxicology, School of Medicine.

• Research concerning the metabolism and toxicity of fluoride is continuing with emphasis on factors that influence the renal handling, gastrointestinal absorption, skeletal and dental deposition and cellular distribution of the ion. Acid-base status has been found to be a particularly important variable which influences these processes. Studies on the effects of high altitude (low oxygen concentrations) on the metabolism of fluoride and the quality of the enamel are in progress as are experiments to determine the physiological basis for the circadian rhythm in plasma fluoride concentrations. In cooperation with the Georgia Department of Human Resources and the Georgia Dental Association, a statewide program for measuring the fluoride concentration of community water supplies has been established. G. Whitford, Department of Oral Biology, School of Dentistry.

• Research into determining individuals who are at risk for coronary disease is being conducted. Cardiovascular disease is the leading cause of death in the United States. While science has learned much about the risk factors which increase an individual's risk for development of atherosclerosis, there are many questions to be answered. It is known that individuals with high plasma cholesterol are at increased risk for development of atherosclerosis and recommendations have been made to reduce our dietary intake of cholesterol and saturated fat. However, many individuals who develop coronary disease do not have marked elevations in their plasma cholesterol. This suggests that other factors may dictate where cholesterol is deposited in the artery wall to form the plaques seen in coronary artery disease. Cholesterol does not circulate in the blood as tiny cholesterol crystals but as a spherical particle containing cholesterol, triglycerides, phospholipids and protein called lipoprotein. These proteins direct the metabolism of the lipoprotein cholesterol by binding to specific cell receptors. A defect in the apoprotein or in the receptor results in abnormal metabolism of the lipoprotein cholesterol which may lead to plaque formation in the artery. The research at MCG focuses on these dependable means of determining an individual's risk for development of coronary disease. If doctors can determine which individuals are at risk, they may be able to prevent or delay the development of disease. R. M. Carroll, Department of Medicine, School of Medicine.

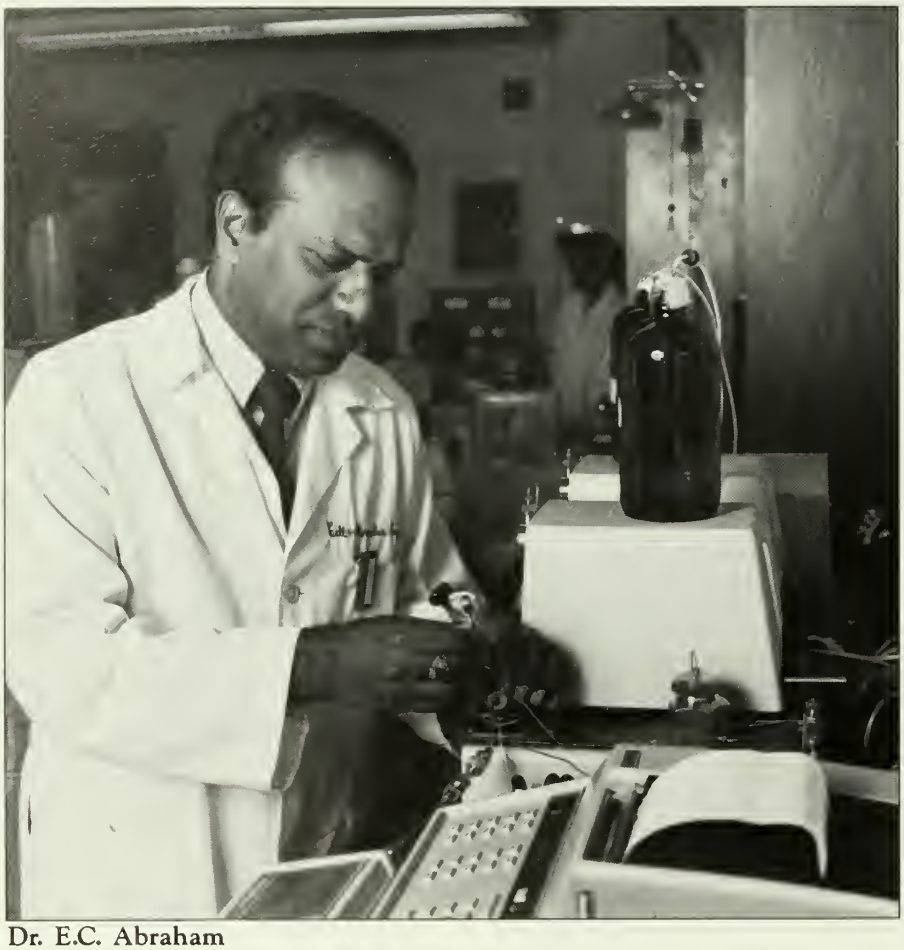


Dr. Jerry Buccafusco

• In the area of hypertension, researchers are looking at the brain's role in that condition. Hypertension, or high blood pressure, is a disease that strikes a large number of Americans. The incidence is particularly high in the state of Georgia. Hypertension can predispose a person to many cardiovascular disorders such as stroke, heart attack and arteriosclerosis. At MCG, researchers are studying the role of the brain as an initiating or causative factor in hypertension. In animal models, the researchers have discovered that a particular chemical, acetylcholine, in the central nervous system can lead to elevated blood pressures. They have demonstrated that pharmacological blockade of the actions of brain acetylcholine leads to a reduction in blood pressure in animals with hypertension. Also, they are beginning to understand the mechanism by which acetylcholine pathways of the brain become altered to cause hypertension. J. Buccafusco, Department of Pharmacology/Toxicology, School of Medicine.

• Another researcher is looking at the structure and function of the DNA molecules which make up human genetic material. One primary aim is to determine how different regions within these molecules interact to assure the normal gene functions that are necessary for proper growth and development. This information will lend insight into the spectrum of gene defects that are responsible for hereditary diseases. Another aspect of the research concerns the development of assays to detect substances that can damage the genetic material by the induction of mutations. Mutations are not only responsible for new cases of hereditary diseases, but they are also one of the primary direct causes of cancer. Thus, the development of improved tests for mutations in human cells will enable us to better determine whether a particular substance is capable of causing cancer by virtue of its mutagenic activity. This information is critical because approximately 1,000 new chemicals, many of them potentially capable of causing cancer, are added to the environment each year. J. Tischfield, Department of Anatomy, School of Medicine.

• The heart pumps blood to the body's organs and tissues in proportion to the needs of each organ or tissue so that the supply of oxygen and other nutrient materials and the removal of waste products matches the metabolic activities of each tissue. For example, when a person runs, blood flow to the muscles in the legs increases dramatically in concert with the increase in activity of the muscles. Similar phenomena occur in the heart. This balance between local blood flow and tissue activity is accomplished by regulatory mechanisms located within a tissue that act on microscopic blood vessels in the microcirculation of the tissue to control the blood flow to the tissue. Research at MCG seeks to understand these local control mechanisms because they are inherently interesting and because they may provide a key to understanding such diverse disease states as hypertension, diabetic angiopathy, Raynaud's disease, systemic sclerosis, sickle cell diseases and numerous other pathological conditions that involve small blood vessels in the microcirculation and local blood flow control. Oxygen, a gas in the air we breathe, is required by all cells of the body and appears to be involved in the local regulation of blood flow. Yet, despite over 100 years of research, the precise role of oxygen in local blood flow regulation remains unknown. The focus of the research in the MCG laboratory is to identify where and how oxygen acts on the microcirculation by directly observing the living microcirculation under conditions of changing oxygen levels. Results from these experiments will not only increase our understanding of the role played by oxygen in the local control of blood flow but also give us more general clues into how blood vessels in the microcirculation function. W. F. Jackson, Department of Physiology, School of Medicine.



Dr. E.C. Abraham

• People with diabetes suffer from many complications involving the kidneys, nerves, vascular system and the eyes. The severity of these complications seems to have an inverse relationship to the degree of diabetic control. Researchers are working to answer several questions about that inverse relationship. Does it mean increased plasma glucose, or hyperglycemia, is directly contributing to this slow degeneration of tissue caused by diabetes? One of the ways glucose can directly participate in the development of these complications of diabetes is through a process called nonenzymatic glycosylation of proteins whereby glucose molecules are attached, rather permanently, to proteins. This process may alter the property of the proteins. Diabetics have a 30-fold increased risk of developing cataracts over the general population. Glycosylation of lens crystallins has been suggested as a contributing factor in the formation of high molecular weight protein aggregates leading to the formation of cataracts. MCG researchers are testing this hypothesis in streptozotocin-induced diabetic rats and by long-term in-vitro glycosylation studies (test tube experiments) of lens crystallin solutions. They also are testing the effect of two other natural constituents of the lens tissue, sorbitol and myoinositol, on nonenzymatic glycosylation of lens proteins, on protein aggregation and cataract formation. These studies are being done with a view toward delaying or preventing these processes. Earlier work and preliminary data have indicated that myoinositol may have an inhibitory effect on these events. E. C. Abraham, Department of Cell and Molecular Biology, School of Medicine.

• The effect of injury on the metabolic function of the lung is being pursued. This project includes study of the regulation of systemic blood pressure by the pulmonary endothelium (cells that lie in the blood vessels of the lungs), as well as development of pulmonary fibrosis and emphysema. C. Watkins, Department of Medicine, School of Medicine.

• In endocrinology, researchers are studying factors that regulate the menstrual cycle with an aim at developing better contraceptives as well as helping women with infertility. V. B. Mahesh, Department of Endocrinology, School of Medicine.

• Also underway in the department is determination of the various factors that control the development and function of the testes or the male gonads. The work specifically focuses on the effects of hormones on testicular function. T. O. Abney, Department of Endocrinology, School of Medicine.

• In anesthesiology, researchers are examining the depressant effect inhalation anesthetic agents commonly used in surgery have on the heart and blood vessel muscles. Researchers hope to learn what biochemical functions of the cardiac cell plasma membrane are affected by anesthetics which might be involved in depression of myocardial contractility. Also, do anesthetic agents interact with cardiac cell membranes at similar sites and with similar effects as other drugs, such as calcium channel blockers, which are used to treat heart disease? The researchers hope to improve understanding of anesthetic-induced cardiodepression, membrane mechanisms involved in cardiac muscle function and, hopefully, an understanding of ways to develop safer anesthetic agents when used in conjunction with other cardiac drugs. The research could aid in reduction of dangers associated with anesthesia and in the potential development of safer anesthetics. R. J. Adams, Department of Anesthesiology, School of Medicine.

• The iris is a highly pigmented tissue which functions as a diaphragm between the outer and posterior chambers of the eye, regulating the amount of light which gets into the eye. In addition, the iris-ciliary body is part of the blood-aqueous barrier which regulates the production of aqueous humor and consequently intraocular pressure. A dysfunction in the latter leads to

glaucoma and possible blindness. In the past, research efforts at MCG have been directed toward objectives of understanding at the molecular level how neurotransmitters such as acetylcholine and norepinephrine, which are liberated from nerve terminals and are involved in communication between cells, control the contraction of the muscles of the iris. They also have studied the biochemical events involved in controlling aqueous humor formation and consequently intraocular pressure. Also, to understand the molecular mechanisms underlying the therapeutic actions of antiglaucoma agents. This will enable ophthalmic researchers to design more effective drugs to control intraocular pressure. Specifically, the neurotransmitters released from the nerve terminals interact with cell surface receptors (proteins) on the muscle cells of the iris to increase the metabolism of polyphosphoinositides, a lipid embedded in the cell surface, to release messenger molecules which, in turn, can regulate a number of biochemical and physiological processes in the muscle cell, including contraction, secretion of proteins and cell growth. One messenger molecule is inositol trisphosphate, which can mobilize and thus increase calcium ion concentration in the cell. The latter can then induce muscle contraction, enzyme secretion or neurotransmitter release. Also, diacylglycerol, which is a lipid embedded in the cell surface that activates protein enzymes and could be involved in enzyme and neurotransmitter secretion and cell growth. Also being studied is arachidonic acid, from which the local hormones (prostaglandins) are produced. Prostaglandins have been shown to be involved in a number of physiological functions and more recently were shown to reduce intraocular pressure. The researchers feel that by understanding the mechanisms of polyphosphoinositide metabolism and the release of the second messenger molecules, they will be able to regulate, through drugs, a number of biochemical and physiological processes in the iris of the eye, including regulation of intraocular pressure in glaucoma patients. A. Abdel-Latif, Department of Cell and Molecular Biology, School of Medicine.

Dr. Margaret Kirby

• Researchers are pursuing what may be the major mechanism by which congenital heart defects are produced. A model for studying defects has been found in baby chicks. M. Kirby, Department of Anatomy, School of Medicine.

• Studies comparing several antihypertensive agents in the elderly are continuing. A. Carr, Department of Medicine, School of Medicine.

• Nursing researchers are collecting data on the effects of walking on the psychological well-being of older people. The researchers are collecting data on 59 patients from six nursing homes. The patients are walking varying distances three times a week. S. Gueldner, Department of Adult Nursing, School of Nursing.

• Studies on drugs altering psychotic and other behavior disorders are progressing. Researchers are looking for antipsychotic drugs that are more effective than the ones now available but which don't have the harmful neurological side effects of those drugs. One such side effect is tardive dyskinesia, a condition marked by uncontrolled movements. Researchers also are looking at an as yet unnamed drug that may offer hope to the victims of Alzheimer's disease. R. Borison, Department of Psychiatry and Health Behavior, School of Medicine.

• Hormones have long been thought to exert their effects on cells by means of a hormone-specific cellular receptor. The receptor undergoes a process of activation only in the presence of the hormone. Once activated, the receptor can induce release of information from storage units called genes located inside the cell's nucleus. Recent studies indicate that the receptor actually binds to portions of the gene during the inductive process. Genes are primarily composed of specific sequences of deoxyribonucleic acid (DNA), and information is released from the DNA by transcription of a complementary substance called ribonucleic acid (RNA). It has been argued that the hormone plays no role in induction of hormone-specific information beyond the initial activation of the receptor. However, recent physicochemical studies have demonstrated that hormones and other intercellular messengers have the capacity for an exquisite "lock and key" fit between specific individual building blocks in the DNA structure, namely the pyrimidines (thymine, cytidine) and purines (adenine, guanine). This suggests strongly that hormones play an additional, more crucial, role during the process of gene induction; most simplistically this may involve insertion of the hormone (a key) into DNA (a lock) by the receptor. In order to prove this possibility, it will be necessary to isolate receptor-binding fragments of DNA, bind preparations of receptor to these fragments in the presence of hormone and determine whether the hormone itself is available for binding to the DNA. It is of equal importance to show that the type of binding is that which has been predicted based on physicochemical principles. If these tasks can be accomplished, then it will alter thinking about receptors in general and may eventually open new inroads into genetic diseases involving processing of information. A. F. Lehner, Departments of Endocrinology and Medicine, School of Medicine. ■

Green seeks knowledge in cause and treatment of glaucoma

Dr. Keith Green wants to illuminate the cause and treatment of glaucoma.

The Medical College of Georgia researcher is working to better understand the physiology of the normal eye and so determine the best treatment for the abnormal eye with glaucoma.

Glaucoma is a sort of catchall word for a number of diseases that result in a raised pressure within the eye that can slowly lead to blindness.

Over the last 18 years, Dr. Green has focused on how fluid gets into the normal eye and how that process can be manipulated.

He's also studied the most effective drugs that exist to treat glaucoma as he searched for newer and still better ones.

Looking at one of the more common types of glaucoma, open angle or simple glaucoma, it appears the problem occurs as fluid attempts to leave the eye.

Fluid for the eye is made from blood by the ciliary body that's found at the back of the iris. The fluid then flows between the iris and the lens into the front chamber of the eye. The fluid flows out of the eye through an angle between the base of the iris and the periphery of the cornea, then on into various little vessels that dump into the body's general circulation.

But with simple glaucoma there is a problem in the fluid's outflow pathway.

"There's a defect somewhere in there, we're not quite sure where," says Dr. Green, a Regents professor of ophthalmology and professor of physiology.

The result is a buildup of pressure within the small, confined space of the eye.

"Fluid level can't rise in the eye because it is a solid structure," Dr. Green said. "What happens is the pressure is going to increase. It's like putting more air into a balloon."

A series of events occurs slowly as this pressure builds.

The tiny vessels that carry blood to the retina of the eye begin to be squeezed by the increased pressure within the eye. Dr. Green equated the process to standing on a hose.

Just as brain tissue cannot survive without oxygen and nutrients, the tissue of the retina begins to deteriorate without these vital substances.

The increased pressure also squeezes nerve bundles in the eye and causes something called cupping of the optic disc. This process cuts off the retinal nerve communications to the brain.

All these activities deteriorate vision. Peripheral vision goes first and, with time, tunnel vision or even total blindness occurs.

A number of drugs and even surgical treatments are available to help check this process, which Dr. Green believes is an accelerated aging process isolated in the eye. "Many of the changes that occur in eyes with glaucoma also are found in the pathological eyes of people 90 and 100 years old," he said. The researcher is not sure what kicks in the acceleration or if it is limited to the eye.

But the years have brought him some interesting insights into the aqueous or fluid formation in the eye.

As mentioned earlier, the ciliary body that produces fluid out of blood and gets the fluid into the eye sits on the back of the iris. There's a two-celled layered membrane through which the fluid passes as it comes out of the ciliary body.

For years it was believed cells in the ciliary body use energy to take this fluid and carry it across the membrane.

"What we have shown, I think fairly definitely, is that this is not the only process by which it occurs," Dr. Green said. "There is some of that going on, but the other method is that the membrane simply and utterly acts as a sieve."

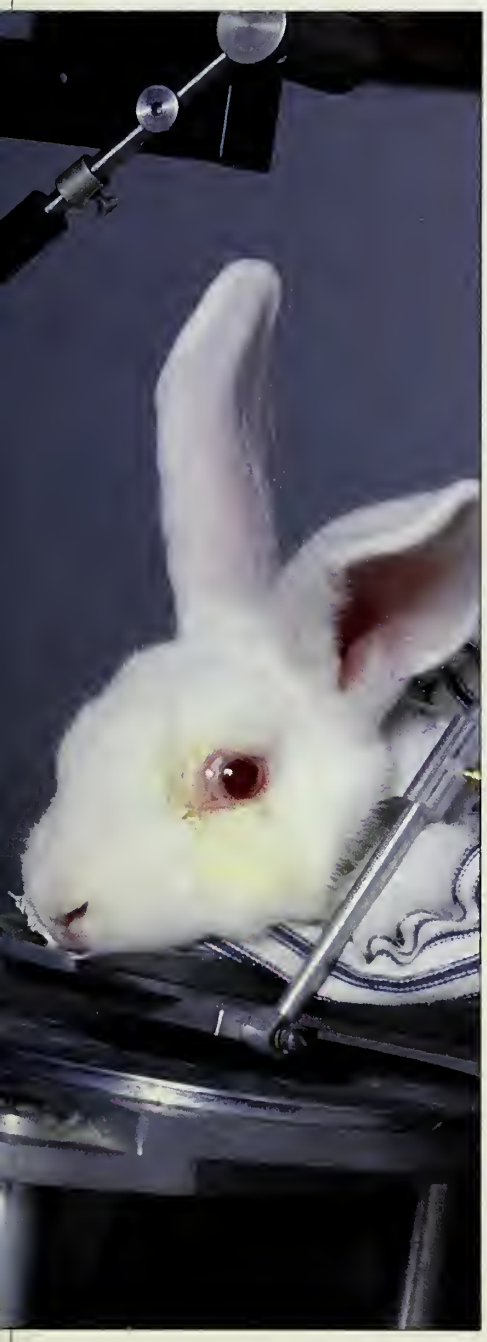
Blood vessels have a pressure and Dr. Green's work has shown that the difference between the blood vessel pressure and the blood pressure within the eye itself forces fluid across the membrane in a filtration method.

In other words, the process of fluid formation is not tied exclusively to secretion as it was believed before, rather the process is about half secretion and half filtration.

"That is important because it makes a big difference in the way you approach glaucoma. Because if you have 100 percent secretion then you want drugs that will decrease secretion, turn the tap off.

"But there is another way of turning the tap off if you can modify the filtration process in some way. That gives us another angle on attacking glaucoma."

Now that Dr. Green knows of the



Dr. Green measures the rate at which fluorescein travels in the cornea and anterior chamber of a rabbit's eye.

filtration process, his laboratory is looking for ways to regulate it. And it looks as though they might have found something.

One new drug they have found that dramatically reduces fluid formation is a water-soluble compound extracted from marijuana and other plants.

"We are very excited about this in one way and disappointed in others," Dr. Green said.

Having a compound that can shut off fluid formation by 80 percent is good, he said. The disappointment is caused by the fact that in their studies with subhuman primates, the compound has proven effective only when it is injected into the eye.

To make this compound an effective treatment for humans it would have to be given as a pill or a spray or drop for the eye. But the molecule is too large to go through the eye when applied topically.

So the MCG laboratory, along with researchers at the Georgia Institute of Technology, are trying to break the large molecule into smaller parts and find its active portion. The compound has proven effective when given intravenously to rabbits, but again, a pill or some form that could be put on the eye would be needed to make it an acceptable medication in humans.

"There is something there. If we can identify which part of that molecule is the active one, maybe we will be able to synthesize some," Dr. Green said. "We also are trying desperately to find out how it does what it does. What I think is happening right now, based upon the evidence we have in hand, is they seem to be working somehow or other, interacting with this ciliary epithelium, the membrane, to cause either configurational changes or structural changes."

No biochemical changes are produced, so it looks as if the compound may work by some sort of attachment of its molecule to the cells in the ciliary body. That attachment may alter the permeability of the cells.

"It opens up a whole new vista in the sense that even if this molecule doesn't work, even if this is a complete flop as a potential (treatment) for glaucoma, which it may well be, the point is it offers another avenue.

Samples of eye tissues are placed in a detector to determine their level of radioactivity after perfusion through the eye. These studies allow the measurement of the effects of glaucoma drugs on blood flow through the eye.

"We've now found that by modifying something, probably on the membrane, you can alter aqueous formation drastically," the researcher said.

Drugs already exist that result in reduced fluid formation and intraocular pressure, but they are not as effective as they could be.

Plus there are the side effects. One drug causes pinpoint pupils that produce problems when trying to focus for close work. Another causes enlargement of the pupil so the eye becomes more sensitive to light. Still another can cause cataracts if you take it for 15 or 20 years.

These side effects can lead to patients not taking their medications. "The key to the treatment of glaucoma medically is it's a 24-hour-a-day disease; therefore, you need 24-hour-a-day treatment," Dr. Green said.

In their study of fluid formation, MCG researchers also have learned that despite the fact that the membrane through which the fluid passes has two cell layers, the entire membrane acts in unison, not separately as it previously was believed.

The researchers also are studying the driving force behind the secretion activity that is involved in formation of fluid in the eye.

"Water doesn't move unless there is a salt for secretion," Dr. Green said. "If we know which salt is moved then maybe there is a way chemically we can modify that, too, by looking exclusively at what energy source this has."

Again, the goal of all these studies is to better understand how the formation of the fluid occurs so drugs can be used to specifically work on that formation.

"The ultimate goal is to delineate completely the normal physiological processes (of) aqueous humor formation and aqueous humor outflow and then to seek drugs which will affect those specific components we've identified," Dr. Green said.

His goal has him looking for more specific acting drugs with minimal side effects.

Right now he is looking at drugs commonly used for treatment of glaucoma and looking at their effects on intraocular pressure. He's also measuring the fluid flow through the eye using new non-invasive techniques and outflow of fluid from the eye. These animal studies are being done on monkeys and rabbits.

Dr. Green hopes to put all these pieces together like a giant jigsaw puzzle that will yield a clearer picture about the causes and appropriate treatments of glaucoma.

There's still another angle regarding control of intraocular pressure the MCG researcher is pursuing.

It's known that women with higher pressures inside the eye tend to experience a reduction in that pressure when they become pregnant.

"What could be the cause of that?" Dr. Green queried. The researchers have studied the effect of the menstrual cycle on pressure inside the eye and there doesn't appear to be a link.

But Dr. Green believes there is a relationship between hormonal changes during pregnancy and reduced intraocular pressure during that time, and he's pursuing that lead. ■

Broken hearts mended at MCG Hospital

Leslie Brown, ballerina, tennis buff, gymnast and former heart patient.

Leslie Brown can twirl on her toes and smash a tennis ball with the best of 'em.

Not bad for a 9-year-old born with a heart defect.

"I think she can do anything she wants to do. She's a pretty brave little girl," said her father, Jack.

Leslie takes ballet twice a week. She was in a tap recital just after her corrective surgery on Valentine's Day two years ago. But she likes ballet better. " 'Cause you don't have to stomp your feet on the floor." She's also a tennis buff and likes gymnastics.

"To look at her you would never know there was a problem," said her mother, Mariam. "She keeps up with her friends. She's a smart student. She eats well and sleeps well and rides her bike all over."

All this is today.

But when Leslie was born she had a hole between the lower chambers of her heart, the pumping chambers, explained Dr. William Strong, chief of the section of pediatric cardiology at the Medical College of Georgia.

The hole, termed a ventricular septal defect, meant there was an excess of blood circulating through her lungs. The defect was not all that uncommon and, as many do, the hole spontaneously closed.

That was not the end of the story.

Although the defect was common, when it healed it did an uncommon thing.

"The process by which it spontaneously closed spawned additional tissue buildup in the heart which led to blockage of the main artery to the body," said Dr. Strong, "It was actually the scar tissue that progressed to produce a worse pathological situation than the original one."

The scarring meant little to Leslie initially as far as her physical activity. But over time her activity became limited. When she was old enough to be exercise tested, doctors at MCG Hospital learned that her heart muscle was not getting enough oxygen during exercise. The artery sending oxygen-rich blood back to the body was being blocked. To push blood past the obstruction, the heart had to become thicker and stronger, much as an arm muscle responds to lifting heavier and heavier weights.

But, the thicker the heart muscle gets, the more oxygen it needs. That's fine at rest, Dr. Strong said. But during

Dr. William Strong performs cardiac catheterization on a young heart patient.

exercise, even with her clear and probably somewhat large coronary arteries, the heart muscle could not get enough oxygen. Until the heart went into failure, the body would continue to get enough oxygen despite Leslie's problem. In these blockage-type defects in children, heart failure is the last manifestation, Dr. Strong said.

It became clear that Leslie would need surgery to remove the tissue and restore her heart to more normal function.

Dr. H. Victor Moore, pediatric cardiovascular surgeon, says he might see one or two cases a year like Leslie's among the some 150 patients he operates on each year.

About 45 different heart problems may affect children like Leslie.

These problems are either those of maturation, when the development process is somehow arrested, or an actual malformation of the heart.

A common problem with maturation is termed patent ductus arteriosus (PDA), which is a persistent communication between the heart's aorta and the pulmonary artery.

In the fetal state, this communication is normal. We are all born with this communication open. But in 99 percent of the full-term babies, the PDA closes within 48 hours after birth. The risk of a premature baby having a persistent PDA is much higher.

If the communication does persist, there will be too much blood flowing to the lungs, something which damages the lungs over the long term. Many of the babies also will have diminished cardiac output secondary to this runoff and have respiratory problems.

"In most cases, as we see (PDA) now, it is the problem of the premature infant," Dr. Moore said.

In those babies, the communication must be closed surgically to prevent future problems.

Transposition of the great vessels, which means oxygen-rich blood flows back to the heart and oxygen-poor goes back to the body, is an example of a malformation of the heart.

Diagnosis of this problem typically is made in the first few hours of life. Babies undergo a palliative procedure at age 6-10 months. Corrective procedures are done later in life.

Dr. Strong listens to the sounds of Stephanie Ruud's heart.

"We probably have the capability of some form of operation for 95 percent of the defects we are presented with," Dr. Moore said.

Although heart surgery on children carries its own peculiarities, Dr. Moore, who has operated on 6-hour-old infants and adults alike, enjoys the work.

"It is a system which provides a great reward for both the family and the physician. Here, you take the most precious thing this family possesses and restore it back to near normal health."

Mrs. Brown reflects on those days when she was a mother facing heart surgery on her 6-year-old.

"We were fortunate to be in Augusta with the medical staff here. When she had her problem, we thought, well we would go to the very best if we had to."

Jack Brown even did some calling around to find the best surgeon for the job. He discovered he need not look farther than the Medical College of Georgia.

"We just decided you have to put your faith in somebody. We put our faith in the folks right here. We couldn't have been more pleased," Mrs. Brown said.

Leslie had a heart catheterization on a Friday and doctors told the parents then she definitely needed the surgery and she really should not leave the hospital. The pressure in the over-worked left ventricle of the heart was very high.

That Monday, Valentine's Day, the parents sent their 6-year-old off to surgery.

"The most empty feeling I've ever had in my life was when they pushed her through those doors and she leaned back to look at us," Leslie's father said.

He could not help but wonder if he would ever see her again.

But Leslie recovered like a champ. The next day she was sitting on the edge of her bed. Within the next few days she was running the hospital halls.

Six weeks after surgery she was riding her bicycle again with big sister Amanda. "Before that, I'd ride her on the back of mine," Amanda said.

Leslie is almost philosophical about her surgery. "I had a hernia operation (before the heart surgery) and everybody thought that wouldn't hurt but it did. Everybody thought heart surgery was going to hurt but it didn't." Still she admits the prospect of surgery was a little frightening.

"We don't think about all the bad things that could happen or could go wrong," Mrs. Brown said. "We just think how fortunate we have been. We will always remember Valentine's Day, won't we Leslie?" ■

EPILEPSY SURGERY

Unusual procedure offers freedom from seizures

"Sewing" Patty Ponder's days are too short, too packed with things she's doing and haunted by others she doesn't have time to do.

But she can remember days that stretched out like vast wastelands.

Those were the days when any moment could bring a seizure.

It all began about 14 years ago with what the Montezuma, Ga., woman calls her funny feelings.

She would feel giddy at times, but it was a distinctly different sensation than plain dizziness. Mrs. Ponder found it difficult to communicate during those times. She'd tell people just to wait and the feeling would pass.

"Nobody ever referred to (the funny feelings) as seizures," Mrs. Ponder said, of the succession of doctors she saw as she and her family moved from Atlanta to Thomaston and finally eight years ago to tiny Montezuma.

But she was prescribed Dilantin, a drug commonly given to epileptics, for her "funny feelings."

Then in 1979 her funny feelings changed.

Her husband, Wayne, had taken off for work one morning. "I went to put the latch on the door and I came to on the kitchen floor." She awoke confused, her body stiff and aching.

That was the beginning of near-daily seizure activity and the episode that brought her to MCG.

"They laid it out," she said. At long last she learned the source of her troubles was epilepsy, a condition in which there's a rapid, abnormal discharging of the brain's neurons that pitches body and mind out of control.

"I was glad that I finally had a diagnosis for something," she said.

For two years, MCG doctors changed Mrs. Ponder's various medications, working to get her seizures stopped by a conventional method.

"Sewing" Patty Ponder at home with her pet Pepi.

But the seizures persisted.

Then she was told about seizure surgery, in which doctors isolate the portion of the brain where the seizures originate and remove it.

"I had no earthly idea that I would ever (agree to) do anything like that," she said. It was her husband's attitude, as much as anything, that moved her to begin the long evaluation process to determine if she was a candidate for the surgery.

Wayne Ponder simply told her he would go for it.

She did.

That was four years ago.

"I just sat home and watched television all day and fussed at the kids," the mother of three boys said of life before the surgery. "I didn't have anything to feel excited about."

Today, she wishes the days were longer so she would have time to cram everything in.

She's parlayed a talent with a needle and thread into a sewing and alteration business, hence her nickname "Sewing" Patty Ponder.

"This is where I spend all day every day," she said, surveying the workroom packed with sewing supplies, clothing in various stages of completion and colorful dolls she designed.

She has another full-time job, that of mother to her three boys: Rob, Brad and Matt.

The 38-year-old woman also is caretaker to a pet menagerie that includes a talking parrot dubbed Pepi, an armful of guinea pigs, two cats, a litter of kittens and a gerbil.

She's also writing a journal about her experiences.

Since the surgery she's been freed from the heavy doses of medicines that dulled her. "I just wonder (how much) I missed," she said, noting she can now pick out anything from a pin prick to a less-than-on-the-ball individual.

Mrs. Ponder falls into the largest category of seizure surgery patients, the 90 percent who are cured or have their seizure activity dramatically reduced.

She has had three seizures in the four years since the surgery. "I would prefer none," she says. "(But) I'm just so grateful I got this far. I'd do it again, that's how good I felt about it."

MCG is one of about a half-dozen centers in the country where patients come looking for what often is their last hope for freedom from seizures.

Dr. Joseph Smith, neurosurgeon, removes depth electrodes as Wanda Littleton, clinical nurse specialist, supports patient.

"This is the end for them," said Wanda Littleton, epilepsy clinical nurse specialist. "They've been on every medicine known to man; they've had every test done on them from several doctors by the time they get to us. We are their last hope.

"If we can't offer anything for them, they don't know where to go or whom to turn to.

"It's a heavy burden," Mrs. Littleton said of being a port of last resort. "If you can't offer patients anything it's depressing. They are depressed, you are depressed. But when you can do something, it's wonderful."

"I think by-and-large they are really gutsy people," Dr. Brian B. Gallagher, neurologist, said of the patients referred to MCG for surgical evaluation. "Generally they are fighting all the time. They keep looking for something to help them.

"We've had engineers and we've had laborers and we've had everything in between," he said of the complement of patients that come primarily from the Southeast but have come from as far as California or Oklahoma.

A typical patient would be someone in their 30s, such as Mrs. Ponder, whose seizures were not controlled in an acceptable manner with drugs.

That might mean that no combination of drugs could stop the seizures or that the huge amounts of drugs taken to control seizures have themselves become a problem.

Most commonly the cause of these abnormal discharges in the brain is unknown. Physicians can see scarring of the brain but they don't know its cause.

Of the identifiable causes, head trauma is a major one.

A certain percentage have specific tumors, said Dr. Don W. King, neurologist. The cause of Mrs. Ponder's seizures was in fact a tumor of such a small size and density that it was detected only at the time of surgery, not by any of the extensive pre-operative tests done to determine if a patient is a candidate for surgery.

It's with this pre-operative testing that doctors both isolate the area of the brain where the seizures originate and determine if that portion can be removed without creating deficits, such as a significant memory loss.

The Wada test is one of these evaluation tools. This test is used to determine the dominant side of the brain, the hemisphere that controls speech.

Should the Wada test determine that the focal point for the seizures is in the dominant hemisphere, seizure surgery will have to be done under local anesthesia so the surface of the brain can be stimulated during surgery and the areas of speech mapped out, said

Barbara House, EEG Technologist, monitors patient's seizures from a monitoring station.

Dr. Herman F. Flanigin.

Dr. Flanigin is a neurosurgeon who came to MCG in 1980 to begin the epilepsy surgery program. Dr. Joseph Smith, a neurosurgeon who is a fellow here, joined Dr. Flanigin in January.

Traditional scalp electrodes and constant video monitoring quickly become a part of a patient's life when he is being evaluated.

Sphenoidal electrodes, thin wire electrodes inserted in each cheek, pick up brain activity that can't be detected by regular scalp electrodes.

If doctors still are not satisfied with the information they've obtained from these tests, Drs. Flanigin or Smith will insert depth electrodes that actually go into the brain and even more accurately pinpoint areas of seizure activity.

MCG has a three-bed diagnostic unit where patients may spend as long as five weeks for these evaluations, having seizure activity monitored around-the-clock.

Minor renovations scheduled for the unit should make "hard-wire" electroencephalograms — they produce the most technically excellent brain wave studies — possible for four patients at once, Dr. King said.

Still, epilepsy surgery program personnel agree that the small, but essential unit has become a bottleneck for patients waiting to get into the program.

At any time, MCG has at least 30 people waiting for a place in that unit. The wait can be six months. For some of those patients, they wait six months only to be told after evaluation they are not candidates for surgery.

"Even now people call me every day," said Mrs. Littleton. She's touched by the stories of all the patients and saddened that she can't get them all in at once.

"One guy was bankrupt and having to sell his furniture. He said he would have a job waiting if he could only have his surgery."

She reflected on another patient, who was a licensed practical nurse but had to work as a store clerk because of his seizures.

And it's not only careers that have been interrupted by seizures but entire lives. "One patient had never been on a date. Now he is married," Mrs. Littleton said.

Many of these patients have only half-lived their lives, spending much of their time at home waiting for the next seizure.

And there is an enormous number of those people.

Dr. Flanigin estimated there are some 400,000 patients in this country who cannot get their seizures controlled by conventional methods.

Probably 50,000 to 100,000 of those people would be suitable for surgery.

But the small number of centers in the country limits the number of procedures done. MCG has done approximately 100 surgical procedures in the past five years. To put that into perspective, there are some programs that only operate on five or six patients each year.

So the backlog of patients builds.

"They see it as a potential means of escaping this specter of seizures that has rendered their lives so abnormal," Dr. Flanigin said of the patients who seek his help.

Each surgical case can last a grueling 10 hours.

In surgery, Dr. Flanigin zeroes in on the affected area of the brain that needs to be removed using skills he began developing in 1948 as a fellow at the Montreal Neurological Institute.

Sometimes there is a trade-off when Dr. Flanigin must leave behind tissue he'd rather remove but cannot because it also is involved with a vital process such as memory.

But he has developed a special procedure for testing memory during surgery that has helped him avoid, at least in two cases, removing tissue that would have resulted in a memory deficit.

During a different procedure, called a corpus callosotomy, the big fiber bundles between the two hemispheres of the brain are cut.

With these patients there is evidence that the two hemispheres are stimulating each other in a Ping-Pong effect. When the bundles are cut, it stops the communication between the two hemispheres.

Dr. Flanigin says epilepsy surgery offers a potential cure — there is about a 50 percent cure rate here — and with refinements in techniques of localizing abnormal tissue and identifying normal or needed tissue, the demand for the procedure likely will grow.

One area of growth already identified is in pediatrics, with younger patients being referred for evaluation.

"It's one thing to stop something that has been going on for 30 years in an adult who tends to be more fixed in a way of life," said Dr. Gallagher. "The salvage rate is somewhat less than if you stop somebody that is 7-years-old from having seizures. That child is going to have his whole life ahead of him." ■

When accident or injury threatens,

the MCG Shock-Trauma Service is ready

A smiling and productive Susan Yates, three years after a near fatal accident.

Susan Yates was tooling home from work Dec. 2, 1982, in her maroon Volkswagen convertible named Vicki.

"That's as much as I remember," she says of the day a drunk driver traveling 90 mph barreled across a median to hit her and Vicki head-on.

"All we ever heard was he was running late to get his hair cut," said the attractive, North Augusta woman.

By the time Miss Yates arrived at the Medical College of Georgia Hospital, she was in severe shock from blood loss. She virtually had no pulse. She was not conscious of her surroundings. She was cut on the scalp, forehead, chin and cheek. Her right and left thigh bones were fractured. Her pelvis also was smashed. She had blood in her abdomen which meant internal injuries.

"Susan Yates just would not have survived in a non-trauma center hospital. She was too sick when she got here. She needed too much, too soon," said Dr. Richard Treat, chief of the section of trauma and surgical critical care at MCG. "Susan Yates is now a happy and productive person in our society."

Miss Yates is just one of the some 200 critically injured patients brought to the trauma service of MCG Hospital each year.

Four years ago MCG Hospital was designated as the shock-trauma center for the East Central Georgia health district — a first for the region and the state.

That designation carried with it a commitment to have surgeons, support personnel and critical care capabilities available around the clock for people such as Miss Yates.

It's a commitment that doesn't fold on weekends, holidays or after 5 o'clock each evening.

"People like this make it worth-

while," Dr. Treat said of his patient, Miss Yates, who at 25 is pursuing her career as a buyer for six department stores. Three years after the accident, her looks belie the fact that she came so close to death.

"Not everybody survives. There's a lot of grief and tragedy to deal with," he said.

But the Susan Yateses "make all the nights, all the tiredness, all the missing of everything worth it," Dr. Treat said.

Dr. Edward Hall, co-director of trauma and surgical critical care, echoed his sentiments.

"Probably the most gratifying thing about trauma is that the vast majority of the patients are among the very young. Trauma is the leading cause of death for people under age 44, not cancer or heart disease," said Dr. Hall, who was drawn to the excitement and variety of critical care after spending time on the service as a resident.

Most of the patients are healthy individuals up to the moment of injury and are able to withstand tremendous physiological insult.

So if medical personnel do everything right, patients not only survive devastating injuries but return to normal lives, Dr. Hall said.

The concept of this ever-ready care for the victims of automobile accidents, stabbings, shootings and other forms of acute injuries grew out of the experiences of war.

During World War II, the military recognized that it could obtain significantly better survival rates with significantly worse injuries if patients were quickly put in the hands of doctors and other medical personnel.

By the Vietnam War, the military had fine-tuned its trauma care with a system that rushed injured soldiers from the field to waiting surgeons.

"A number of young trauma surgeons sent to Vietnam who had had disorganized trauma training saw an organized system and how it worked," Dr. Treat said. "Then they traveled 8,000 miles from the remote jungles of Vietnam and saw people dying in the cities because there was no such system."

That war-time experience and subsequent studies, which told organized medicine it wasn't doing the best job of caring for trauma, led to a national effort toward improving emergency medical services.

It has not always been a popular movement.

Physicians and hospitals alike have often cried foul over designation of trauma centers.

Concern over how it might look to

Dr. Edward Hall (center, wearing glasses) quickly assesses a patient's injuries.

the public if a particular hospital is not selected as a trauma center is a common problem. Financial worries over what this designation would do to referral patterns for patients is another.

"The fact of the matter is we are talking about a very small fraction of patients. Five percent of the victims of automobile accidents are severe enough to require trauma center care," said Dr. Treat.

So, designation does not cause a major movement of patients.

Also, every hospital does not need to be a trauma center, primarily because it is a tremendous commitment of resources and people. And, the patient load is so small that with too many centers, no one place will get the experience needed to stay sharp.

Dr. Treat came in 1979 to start MCG's service at the request of Dr. Arlie R. Mansberger Jr., chairman of the department of surgery.

Dr. Mansberger was one of three primary surgeons who developed one of the first trauma centers in this country, what is now the Maryland Institute of Emergency Medical Services Systems Inc. The chairman was interested in initiating a similar service in Augusta.

In July 1981, MCG had its organized trauma service operational, a full four months before actual designation by a committee of the East Central Georgia Emergency Medical Services Council.

"There were major alterations by many hospital divisions in order to make this effort come to fruition," Dr. Treat said.

The laboratory had to devise a method of getting back test results on trauma patients even more quickly than STAT. "Our patients often have to be in the operating room five or 10 minutes after they get here," Dr. Treat said.

The blood bank had to make major commitments to increase the total units of blood available. Most important was a means to make blood immediately available for patients who are dying, when there is no time even to learn the patient's name, much less his blood type.

It wasn't enough for X-ray capabilities to be available around-the-clock.

Dr. Richard Treat amid a packed trauma room that may have to double as an operating room when time becomes critical.

"Twenty-four hours a day isn't good enough, we need them in 20 minutes," Dr. Treat said. "We can't get an arteriogram in an hour. An hour from now our patients are dead. At 3 o'clock in the morning, if we need them, we need them now," Dr. Treat said.

Surgery also had to make a commitment to keep more and higher-level trained surgeons always in-house.

Anesthesiology had to do likewise.

"Trauma care is an intensity specialty," Dr. Treat said. "The key is the immediate availability of surgeons to intervene in a life-threatening emergency."

Therein lies an obvious difference between a trauma center and a traditional emergency room.

"Emergency room doctors are trained and qualified in initiating resuscitation, which they often can't complete in trauma patients because they often need operations to do so," he said. "That's why trauma is a surgical care specialty."

"The real ultimate advantage of a trauma center in an immediate sense is that a surgeon sees you immediately," said Dr. Hall.

Experience has shown that when a patient with a life-threatening injury or critical multiple injuries is taken to the nearest emergency room, the average response time for a surgeon is 45 minutes from the time he is called.

Trauma victims usually don't have 45 minutes.

When a patient hits the door at MCG Hospital, a complement of general surgeons, anesthesiologists, X-ray personnel, respiratory therapists and other needed support personnel are there waiting.

A single telephone call assembles the group in less than a minute.

At least a senior-level surgery resident is in the hospital at all times. The three attending physicians on the trauma service swap taking calls. Dr. Lee John Skandalakis joined the trauma service in August as the third attending.

Initial assessment and resuscitation are done in the trauma room within the emergency department. "It has more equipment per square inch than probably any other room in the hospital," Dr. Treat said.

"Every patient is a challenge because of the severity of the injury," said Dr. Hall. There are the subtle injuries that hide from view and the obvious where nearly every body system is smashed.

"I like it because it's constantly exciting and every patient is different,"

Trauma nurse Cecelia Hilliker takes care of patient in Shock-Trauma ICU, an "intensive-intensive," care unit.

said Dr. Hall. "You can't read about a lot of the injuries we see. Every one is different."

"When somebody comes in and they are dying you can't go pull out a book and start reading about injuries to the larynx and how to treat them," Dr. Treat said.

"You never know what injuries you are going to get so you have to be prepared to do anything."

Sometimes "anything" means turning the trauma room into an operating room.

"There are times when there is not time to take a patient across the hall to the operating room," says Dr. Treat.

More typically patients are taken from the trauma room to the operating room or the Shock-Trauma Intensive Care Unit.

This three-bed unit, also packed with people and personnel, is what Dr. Hall terms the "less obvious" advantage of a trauma center.

"The vast majority of general surgeons can efficiently and adequately do operations to handle trauma. But the real key to survival for these patients after that immediate impact is the constant presence of doctors who are watching over them . . . a sort of captain of the ship concept, a surgeon who writes all the orders and deals with all the organ systems," Dr. Hall said. "That's not to say he doesn't get (consultations) and help from other services. But he calls all the shots. He is there to deal with your complications as they arise."

The surgeons aren't the only ones camping out at the bedside of patients in the ICU.

There's minimum one-to-one nursing in the unit. These professionals aren't sitting at a desk watching a monitor. They are constantly at the bedside attending to the needs of a patient.

Additionally, there is always an anesthesiologist present in the unit. That means if the trauma team gets another patient after just getting one settled into the unit — and it does — the patient in the unit still has the constant care of a physician.

It's into the three-bed unit that the most critical or demanding patients go until they are ready for less "intensive-intensive care," or they need some other specialty unit such as the Neuro ICU.

Miss Yates spent two months in the Shock-Trauma ICU.

"It was hard for me to realize I was out for two months. It felt like I slept overnight." She has hazy memories of those months. "I can remember them coming in and out, taking X-rays, leaning to look at what the doctors were examining. I can remember almost all the nurses in there by name," she said of the personnel who became her support group.

"Everybody is doing everything for you. You sleep, you wake up, you sleep, you wake up. Everything else is pretty much done for you."

It's patients such as Miss Yates who benefit most from the "intensive, intensive care" provided in the Shock-Trauma ICU.

Perhaps the highly-visible, immediately-available trauma team that converges on a patient in the trauma room seems the most dramatic aspect of the service.

A patient with penetrating trauma, such as a knife wound to the heart, can come in with no blood pressure or pulse, be rushed to the operating room and within the hour his fate will be known. MCG has had such patients who recovered and went home in five days.

But it's injuries such as those of Miss Yates, when the full damage becomes apparent only over days, that mandate the long-term critical care provided by the unit.

That's why the trauma service is not just an emergency room or surgeons.

But it's a large part of what makes trauma care appealing to Drs. Treat and Hall.

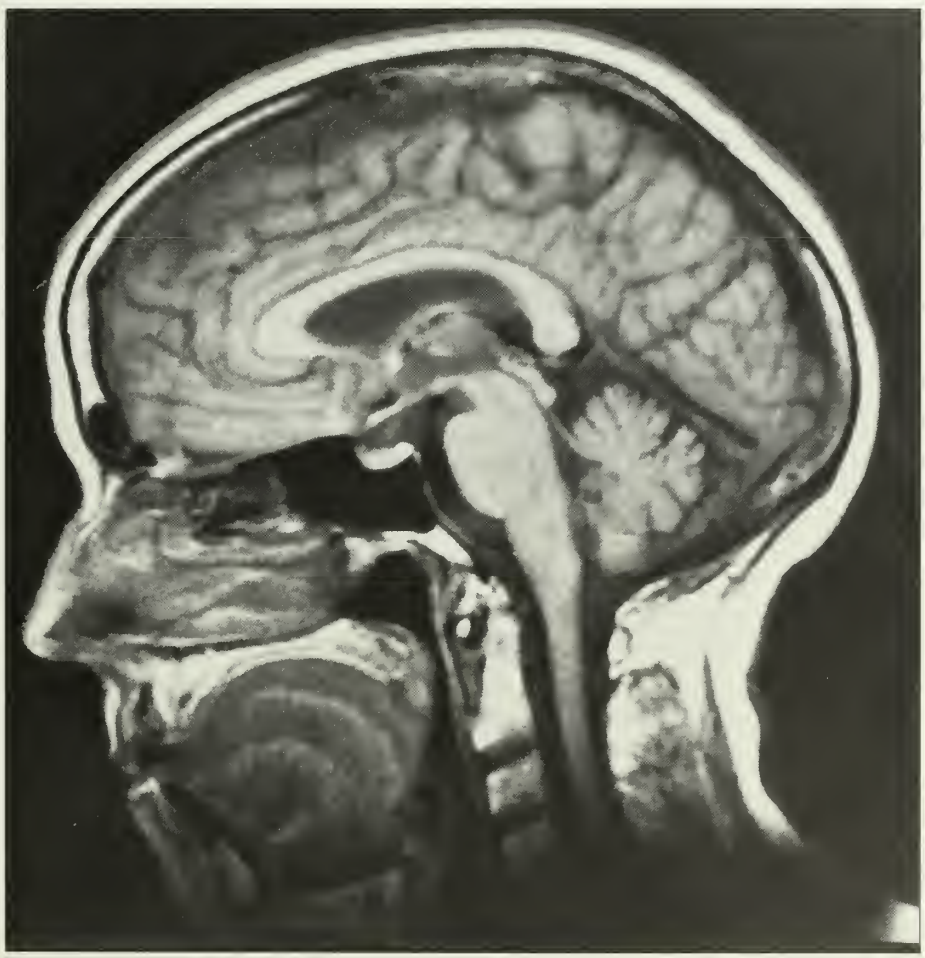
"Taking people that often would have died and having them fit right back into society and lead a useful and satisfying life," the trauma chief said.

In four years with approximately 1,300 patients, the trauma service has only had a handful of patients who were brain-damaged to the point that a return to normal life was not possible.

Commented Dr. Treat, "What we've done is created a large number of active, living, return-to-full-life, working, raise-your-kids, interact-with-society patients."

As one of those patients Miss Yates says she feels "damn lucky." She's been shown how quickly life can be taken. "If there's something you'd like to do, do it," she advises. "You might not get another chance." ■

Patient care services expanded



Magnetic resonance images of soft tissue approach the detail of fine-line anatomical drawings.

The Medical College of Georgia has enhanced patient care with a number of new and expanded services.

Here are some highlights of those services.

• The latest in imaging technology became available at MCG in September when the first magnetic resonance imaging scan was performed. MCG personnel began a planning and selection process for the scanner about two years ago. The MRI uses a powerful magnet to produce lifelike body images. Its diagnostic abilities have proven useful in everything from cancer to heart disease. MRI has become especially useful in neurological problems and indeed already is considered the gold standard for the diagnosis of multiple sclerosis. Further uses still are being explored. A unique feature of the MCG unit is the ability to study the body's chemistry without tissue or fluid samples ever being taken from a patient. MCG should have that aspect of MRI, called spectroscopy, operational by early 1986.

• Technology to help newborns also was boosted with the addition of ECMO — extracorporeal membrane oxygenation. ECMO is a small heart-lung bypass machine, similar to that used in open-heart surgery, which oxygenates the blood of newborns who have reversible lung injury. These babies cannot be supported by conventional ventilation alone. The pump gives the babies' lungs time to rest and recuperate. Babies who might be in need of such technology are those whose lungs are damaged because of breathing in some foreign substance or those whose blood vessels to the lungs don't open at the time of birth as they should.

• To assist couples having trouble conceiving, MCG has initiated an in vitro fertilization program. Couples have come to the program primarily from Georgia, but also from South Carolina, Florida and even Paris, France. Program officials anticipate serving four to five patients each week as the new service develops.

• The kidney transplant program at MCG also has been expanded to encompass children. Kidney transplants now are performed on children as

Daniel Bass, MCG Hospital pediatric kidney transplant patient.

young as age 2. To augment that effort, a pediatric nephrologist and clinical nurse specialist have been added to the staff. Program officials expect to do five or six transplants on children annually.

• MCG's kidney procurement program has grown to a full organ procurement program. Since January 1982 the team has coordinated procurement of a number of organs, such as hearts and livers, for transplant teams coming into Augusta to retrieve them. Transplant teams assisted include those from the University of Pittsburgh, the Medical College of Virginia and Johns Hopkins University. In January 1985, MCG officially moved from a kidney procurement program to more general organ procurement.

• Emergency services at MCG Hospital have been enhanced with the addition of a three-bed monitored holding area for patients awaiting admission to the hospital or those who need to be observed for a time before being sent home. The waiting room and clerical work area for emergency services also have been renovated. In more recent months, vigorous faculty recruitment for this service has increased the total number of faculty positions from two to five.

• Pediatric patients also got a new cardiac catheterization laboratory in May 1984. This lab, designed for children, replaced an older version, circa the late 1960s and early 1970's. The new lab allows pictures of the heart to be taken from two angles at once, thereby reducing the amount of contrast medium a child must be given and reducing his risk and discomfort. Also, the camera can be moved around the patient instead of vice versa, making the procedure, once again, safer and more comfortable for the child.

• Cancer care for children has been boosted with the addition of a nurse practitioner, physicians assistant and play therapist to the pediatric oncology team. MCG also is participating in a National Cancer Institute-funded program that makes new and even investigational cancer treatments available to children who are not responding to more conventional therapies. MCG also has joined the Children Cancer Study Group, the largest cooperative group in the United States involved with the clinical study of children with cancer.

• Care of the yet unborn baby and his mother also has been expanded. MCG now has a system where an unborn baby's breathing, movement and heart rate are monitored, the information fed into a computer and an assessment of that baby's progress can be made. Norms are known for developing children, and doctors can compare the information they've collected to those norms in an effort to determine how the child is progessing and whether an early delivery might be best. Also, as an aid to patient management is the availability of a computer-analysis of the fetal heart rate. The fetal heart rate test is still the primary means of determining fetal health. Both of these services are non-invasive, which means the mother doesn't have to have any type of incision, and are aimed at reducing risk in high-risk pregnancies.

• Other modifications to MCG Hospital have yielded a model nursing unit and clinic. A 30-bed nursing unit, opened in late May on Eight South, was intended as a model for nursing units throughout the entire hospital. Attempts to duplicate and improve on the homey, non-institutionalized atmosphere of Eight South will be made as MCG Hospital progresses with its long-range renovation plan. On the hospital's first floor, the Physicians Practice Group Diagnostic Clinic offers another model for future clinic plans at MCG. Once again, the comfortable setting of the clinic was designed to give faculty a place to see their patients.

• Speech and hearing services at MCG have been expanded to provide a full range of services to the hearing impaired and those with speech difficulties. Services include conventional hearing evaluation, evaluation of balance disorders, and hearing aid evaluation and fitting. In the area of speech disorders, persons with language and speech disorders such as stuttering and aphasia following a stroke, also can get help here. MCG has boosted its speech and hearing staff to accommodate the expanded services. ■

The 1984-85 Benchmark

Dear Alumni and Friends,

The Medical College of Georgia continued to improve its private sector support during the 1984-85 fiscal year. We are grateful to the 1,800 contributors and many volunteers for making this vital funding possible.

Gifts and grants totaled $3,274,546 and came from these categories:

Individuals — $993,085
Foundations — $476,331
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Private sector support continues to be an important financial source to the Medical College of Georgia.

The state of Georgia provides approximately 50 percent of our operating budget. The remainder comes from student fees, patient revenues, auxilliary services, federal government grants and contracts, as well as private sector gifts and grants.

We appreciate the support from the state of Georgia and all state officials and the taxpayers who make it possible. We also are challenged to continue seeking private sector support for education, research and patient care programs that help people live longer, healthier lives.

Your help is appreciated. We hope it will continue.

Very cordially yours,

John T. Anderson,
Vice President for Development

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